CLAIMS

What is claimed is:

1. A motor control apparatus supplying AC power to a motor having a plurality of motor windings, comprising:

an inverting part comprising:

a bridge circuit having a plurality of first and second switching units, and supplying the AC power to the motor;

brake relays short circuiting the motor windings by turning on when the motor brakes;

brake resistors, respectively, connected to the plurality of motor windings and consuming an overcurrent generated by the motor when the brake relays short circuit the plurality of motor windings; and

a switching controller turning on and turning off one of the first and second switching units provided in respective opposite ends of the inverting part so that the overcurrent consumed by the brake resistors is changeable in proportion to a rotation speed of the motor, when the brake relays short circuit the plurality of motor windings.

2. The motor control apparatus according to claim 1, wherein the overcurrent consumed by respective one or ones of the brake resistors is changed in proportion to a duty cycle of the first and second switching units turned on and turned off by the switching controller.

3. The motor control apparatus according to claim 2, further comprising:

a speed detecting part detecting the rotation speed of the motor, wherein the switching controller turns on and turns off the first and second switching units so that the duty cycle of one of the first and second switching units is in proportion to the rotation speed of the motor detected by the speed detecting part.

4. The motor control apparatus according to claim 1, wherein each of the first and second switching units of the inverting part comprises:

a transistor; and

a diode connected in parallel to the transistor.

5. The motor control apparatus according to claim 2, wherein each of the first and second switching units of the inverting part comprises:

a transistor; and

a diode connected in parallel to the transistor.

6. The motor control apparatus according to claim 3, wherein each of the first and second switching units of the inverting part comprises:

a transistor; and

a diode connected in parallel to the transistor.

7. A control method of a motor control apparatus having an inverting part comprising a bridge circuit including a plurality of first and second switching units, and supplying AC power to a plurality of motor windings of a motor, and brake resistors connected to the plurality of motor windings and consuming an overcurrent generated from the motor when the motor brakes, comprising:

braking the motor by short circuiting the plurality of motor windings; and

turning on and turning off one of the first and second switching units provided in respective opposite ends of the inverting part so that the overcurrent consumed by the brake resistors is changeable according to a rotation speed of the motor.

8. The control method of the motor control apparatus according to claim 7, wherein the overcurrent consumed by respective one or ones of the brake resistors is changed in proportion to a duty cycle of the one of the first and second the switching units turned on and turned off.

9. The control method of the motor control apparatus according to claim 8, further comprising:

detecting the rotation speed of the motor, wherein turning on and turning off the one of the first and second switching units comprises:

turning on and turning off the first and second switching units according to the duty cycle changed in proportion to the detected rotation speed of the motor.

10. A motor control apparatus supplying AC power to a motor having a plurality of motor windings, comprising:

an inverting part including a plurality of first and second switching units to supply the AC power to the motor;

brake relays short circuiting the motor windings when the motor brakes;

brake resistors, respectively, connected to the plurality of motor windings to control an overcurrent generated by the motor when the brake relays short circuit the plurality of motor windings by selectively switching the plurality of first and second switching units; and

a controller to control the plurality of first and second switching units in accordance with a rotation speed of the motor, when the brake relays short circuit the plurality of motor windings.

11. A motor control apparatus supplying AC power to a motor having a plurality of motor windings, comprising:

an inverting part having a plurality of first and second switching units to supply the AC power to the motor;

brake relays short circuiting the motor windings by turning on when the motor brakes;

brake resistors, respectively, connected to the plurality of motor windings to exhaust power from an overcurrent generated by the motor when the brake relays short circuit one or more of the plurality of motor windings; and

a controller to turn on and turn off one of the plurality of first and second switching units so that the power exhausted by the brake resistors corresponds to a rotation speed of the motor, when the brake relays short circuit the one or more of the plurality of motor windings.

12. A motor control apparatus supplying power to a motor having a plurality of motor windings, comprising:

a plurality of first and second switching units to supply AC power to the motor;

brake resistors, respectively, connected to the plurality of motor windings to exhaust power from an overcurrent generated by the motor; and

a controller to control selective ones of the plurality of first and second switching units so that the power exhausted by the brake resistors corresponds to a rotation speed of the motor.

13. A motor control apparatus supplying power to a motor having a plurality of motor windings, comprising:

a plurality of switching units to supply AC power to the motor;

brake resistors, respectively, connected to the plurality of motor windings to exhaust power from an overcurrent generated by the motor; and

a controller to control selected ones of the plurality of switching units so that the power exhausted by the brake resistors corresponds to a rotation speed of the motor.

14. The motor control apparatus according to claim 13, wherein the overcurrent consumed by respective one or ones of the brake resistors is changed in proportion to a duty cycle of the switching units turned on and turned off by the controller.

15. The motor control apparatus according to claim 14, further comprising:

a speed detecting part detecting the rotation speed of the motor, wherein the switching controller turns on and turns off the switching units in accordance with the rotation speed of the motor.

16. The motor control apparatus according to claim 15, wherein the plurality of switching units comprises:

a first plurality of switching units and a second plurality of switching units connected, respectively, in parallel to supply the AC power to the motor, wherein the controller turns on and turns off the first plurality of switching units and the second plurality of switching units so that the duty cycle of one of the first and second switching units is in proportion to the rotation speed of the motor detected by the speed detecting part.

17. The motor control apparatus according to claim 16, wherein each of the first and second switching units comprises:

a transistor; and

a diode connected in parallel to the transistor.

18. The motor control apparatus according to claim 13, further comprising:

brake relays to short circuit the motor windings by turning on when the motor brakes and to prevent the motor from rotating by an external force by being maintained on when the motor is stopped.

19. The motor control apparatus according to claim 15, wherein the speed detecting part transmits information of the detected speed of the motor to the controller to control the selected ones of the plurality switching units to turn on and turn off by the duty cycle changed in proportion to the rotation speed of the motor.

20. The motor control apparatus according to claim 16, wherein, when one or more of the one of the first and second plurality of switching units are turned on, the overcurrent from the motor is shunted through the one or more of the one of the first and second plurality of switching units and the overcurrent flowing is reduced or eliminated through respective ones of the brake resistors connected between the one of the first and second plurality of switching units, and, when the first and second plurality of switching units are turned off, the overcurrent from the motor flows through the brake resistors and is prevented from flowing through the one of the first and second plurality of switching units.

21. The motor control apparatus according to claim 16, wherein, when the overcurrent is generated, power from the motor is consumed in the brake resistors in proportion to a time respective one or ones of the brake resistors have overcurrent flowing therethrough.

22. A method of controlling a motor, comprising:

supplying power to the motor by a plurality of first and second switching units;

short circuiting the motor windings when braking the motor;

connecting brake resistors, respectively, to the plurality of motor windings; and

controlling an overcurrent generated by the motor when short circuiting the plurality of motor windings by selectively switching the plurality of first and second switching units in accordance with a rotation speed of the motor.

23. The control method of the motor control apparatus according to claim 22, wherein the controlling of the overcurrent comprises:

changing a duty cycle of one of the first and second the switching units; and

consuming the overcurrent by respective one or ones of the brake resistors.

24. The control method of the motor control apparatus according to claim 23, further comprising:

detecting the rotation speed of the motor; and

turning on and turning off the one of the first and second switching units according to the duty cycle changed in proportion to the detected rotation speed of the motor.

25. The motor control apparatus according to claim 16, wherein the turning on and turning off of the one of the first and second switching units comprises:

when the one of the first and second switching units is turned on, shunting the overcurrent from the motor through the one of the first and second switching units and reducing or eliminating the overcurrent flowing through the brake resistors, and

when the one of the first and second switching units is turned off, flowing the overcurrent from the motor through the brake resistors and preventing the overcurrent from flowing through the one of the first and second switching units.

26. A method of controlling a motor, comprising:

supplying power to the motor by a plurality of first and second switching units;

short circuiting the motor windings when braking the motor;

connecting brake resistors, respectively, to the plurality of motor windings; and

exhausting power by the brake resistors corresponds to a rotation speed of the motor, when short circuiting one or more of the plurality of motor windings.

27. A method of controlling a motor, comprising:

supplying power to the motor by a plurality of first and second switching units;

connecting brake resistors, respectively, to a plurality of motor windings and exhausting power from an overcurrent generated by the motor; and

controlling selected ones of the plurality of first and second switching units so that the power exhausted by the brake resistors corresponds to a rotation speed of the motor.

28. A method of controlling a motor, comprising:

supplying power to the motor by a plurality of switching units; and

exhausting power from an overcurrent generated by the motor by controlling selected ones of the plurality of switching units so that the power exhausted by the brake resistors corresponds to a rotation speed of the motor.

29. A method of controlling a motor, comprising:

supplying power to the motor;

detecting a rotation speed of the motor

braking the motor; and

consuming an overcurrent according to the rotation speed of the motor when braking the motor.